REMARKS

Applicants respectfully request reconsideration of the rejection of claims 1-33 under 35 U.S.C. §103(a) as being unpatentable over the combined teachings of U.S. Patent No. 5,070,197 (Chin et al.) and U.S. Patent No. 5,614,468 (Kramer et al.).

Claim 1 is directed to a process for preparing a sodium glyphosate composition comprising mixing in a reactor particulate glyphosate acid, sodium hydroxide, water and optionally adjuvant to form a reaction mass wherein the total amount of water added to the reaction mass is from about 10% to about 40% by weight of all of the particulate glyphosate acid, sodium hydroxide, water and any adjuvant added to the reactor. The glyphosate acid and sodium hydroxide react exothermically, generating heat and causing partial evaporation of the water and forming a sodium glyphosate paste having a moisture content of about from 2% to about 20% by weight.

Independent claim 19 is directed to a continuous process for preparing a dry granular sodium glyphosate composition. The process comprises continuously feeding particulate glyphosate acid, sodium hydroxide, water and optionally adjuvant to a continuous reactor to form a reaction mass and reducing the water content of the reaction mass to first form a sodium glyphosate paste in accordance with claim 1. An adjuvant is added to the sodium glyphosate paste to form an extrudable sodium glyphosate mixture with the weight ratio of total adjuvant to sodium glyphosate being from about 1:20 to about 1:2 on a glyphosate acid equivalent basis. The extrudable sodium glyphosate mixture is fed continuously to an extruder having an inlet, a conveyor and an outlet having a screen and is extruded through apertures in the screen to form extrudate strands that

break to form moist coherent granules. The granules are subsequently dried to produce the dry granular sodium glyphosate composition.

The claimed invention produces a downstream processable sodium glyphosate paste composition of the requisite moisture content by reacting particulate glyphosate acid and sodium hydroxide in a reaction mass wherein the total amount of water added to the reaction mass is from about 10% to about 40% by weight of all of the particulate glyphosate acid, sodium hydroxide, water and any adjuvant added to the reactor. Reacting glyphosate acid and sodium hydroxide in a reaction mass in this manner allows the reaction mixture to be more readily homogenized, enabling the reaction to proceed more smoothly and completely, with greater ease of temperature control as compared to conventional solid-state reaction systems and ensures sufficient moisture remains after evaporative cooling of the reaction mass to form a downstream processable sodium glyphosate paste of the desired consistency. Surprisingly, the sodium glyphosate paste produced in accordance with the claimed process has been found to have the required absorbency and/or adsorbency properties to enable efficient formulation as a dry granular herbicidal composition by: adding adjuvant to the downstream processable sodium glyphosate paste to form an extrudable sodium glyphosate mixture; extruding the extrudable sodium glyphosate mixture to form moist coherent granules; and drying the granules as set forth in independent claim 19. Thus, the present invention combines rapidity, completeness and uniformity of reaction to produce a sodium glyphosate product exhibiting desirable qualities suited for downstream processing and formulation.

In order to establish a *prima facie* case of obviousness, the prior art reference(s) must teach or suggest all the claim limitations, there must be some suggestion or motivation, either in the reference(s) itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings and obtain the claimed invention, and there must be a reasonable expectation of success. See MPEP § 2142. Applicants respectfully submit that the Office has failed to establish a *prima facie* case of obviousness with respect to the claimed invention.

Chin et al. is mentioned at page 5, paragraph 0016 of applicants' specification. This reference discloses a continuous extrusion process in which a pesticidal Bronsted acid, such as glyphosate acid, for example, among many others, is admixed with a Bronsted base, preferably NaOH, KOH, $(C_2H_5)_2NH$, $(HOC_2H_4)_2NH$ or $(HOC_2H_4)_3N$, and reacted in an extruder to produce a granular pesticidal extrudate.

The primary objective of the process disclosed by Chin et al. is the preparation of **solid**, water-soluble or water-dispersible pesticidal salts (See, for example, col. 4, lines 51-53; and col. 3, lines 40-43), not a paste. The so-called "dry reactive method" disclosed by Chin et al. is performed essentially without the addition of any extraneous solvent and under conditions where the water of reaction volatilizes and is driven off by the resultant heat of reaction **so that a solid end product can be formed in a single step** (See, for example, col. 1, lines 52-62). Optional water addition to the reaction admixture is mentioned as a diluent for the Bronsted base, heat sink and/or lubricant; the amount of water added to the reactor being determined by the exotherm to be controlled, the heat

capacity of the water and the amount of water (including water produced by the reaction, if any) to be driven off by the heat of reaction. However, Chin et al. teach that it is advisable to determine whether it is feasible to conduct the reaction in the absence of any heat sink (See col. 4, lines 6-16). Applicants can find no disclosure in Chin et al. of mixing particulate glyphosate acid, sodium hydroxide and adding water in an amount of from about 10% to about 40% by weight of all of the components of the resulting reaction mass. Significantly, in the only example of Chin et al. in which glyphosate acid as the Bronsted acid and sodium hydroxide as the Bronsted base are reacted (Example 2), no extraneous water was added to the powdery glyphosate and sodium hydroxide pellets fed to the extruder and the water content of the resultant product is not disclosed. In fact, in all of the examples of Chin et al., no extraneous water was added. The clear preference in Chin et al. is that the reaction be performed essentially without the addition of any extraneous water to the reaction mixture to obtain a solid end product in a single step. Accordingly, Chin et al. fail to teach or suggest addition of water to a reaction mixture of glyphosate acid and sodium hydroxide in an amount of from about 10% to about 40% by weight or conducting the process in a manner so as to produce a downstream processable sodium glyphosate paste composition having a moisture content of from about 2% to about 20% by weight in accordance with the claimed invention.

The deficiencies in Chin et al. cannot be overcome by resort to Kramer et al.

Kramer et al. describe a solid-state process for forming ammonium glyphosate by reacting an ammonium hydroxide solution

with partially dried glyphosate acid. Neither Kramer et al. nor Chin et al. provides any suggestion or motivation to modify the references or combine reference teachings to overcome the above-noted deficiencies of the primary reference with respect to the features of the process as claimed. The solid-state process as disclosed by Kramer et al. is limited to the production of ammonium glyphosate and the reference does not teach or suggest its application to a process for the production of a sodium glyphosate paste as claimed. In fact, Kramer et al. make reference to Chin et al. and expressly teach away from production of sodium glyphosate compositions as disadvantageous (e.g., less resistant to ambient humidity, more difficult and expensive to make and process and containing a lower concentration of the active glyphosate) as compared to counterpart ammonium glyphosate salt compositions (See col. 4, lines 22-47).

Moreover, even if one skilled in the art were to combine the cited references, the claimed process would not be obtained. The process disclosed by Kramer et al. results in the formation of dry or granular ammonium glyphosate products that have a specific shape and volume and are resistant to deformation (See col. 5, lines 3-5), and not a paste as called for in the instant claims. In the process of Kramer et al., glyphosate acid wet cake is charged to a reactor and dried to a moisture content of below about 6% by weight (See col. 5, line 61 to col. 6, line 5). Ammonium hydroxide solution is slowly added to the glyphosate acid wet cake to produce a powdered ammonium glyphosate reaction mass/product. More precisely, Kramer et al. teach that the ammonium hydroxide solution is added at a rate such that the rate at which water is introduced into the

reaction mass (i.e., both with the ammonium hydroxide solution and formed as a product of the reaction between the glyphosate acid and ammonium hydroxide) is slower than the rate at which moisture is being driven off to ensure "that the moisture content of the reaction mass consistently decreases from the initial concentration of circa 6 wt.% down to about 2 wt.% (i.e., loss of weight on drying or LOD) or less during the period in which ammonium hydroxide is added and the exothermic reaction proceeds" (See col. 6, lines 20-37). Kramer et al. specifically note that "adherence to the process of the present invention and the manner and extent to which the reaction between the glyphosate acid and the ammonium hydroxide is controlled in accordance with the process, are critical in ensuring the creation of a solid, free-flowing (i.e. non-caking) and water soluble ammonium glyphosate salt" (See col. 5, lines 20-26). Indeed, formation of a viscous, "dough-like" product by simple admixture of glyphosate wet cake (6-20% by weight moisture content) and ammonium hydroxide in stoichiometric quantities is discredited as being incompatible with further processing and distinguished from the product of the process disclosed by Kramer et al.(See col. 5, lines 12-20).

Applicants acknowledge the assertion on page 3 of the Office action that the prior art shows processes including reaction of glyphosate acid with certain bases such as sodium and ammonium hydroxide in which the exothermic heat of reaction is used to drive off water from the reaction mixture. However, applicants' claims are not drawn to an invention of such scope. More particularly, neither Chin et al. nor Kramer et al., either alone or in combination, teach or suggest the claimed process that requires mixing glyphosate acid, sodium hydroxide and

adding water in an amount of from about 10% to about 40% by weight of all materials in the reaction mass to form a paste product having a moisture content of from about 2% to about 20% by weight.

In view of the above, applicants respectfully submit that the Office has failed to establish a *prima facie* case of obviousness with respect to independent claims 1 and 19. Dependent claims 2-18 and 20-33 are likewise submitted as patentable for the reasons set forth above and the further features recited therein.

It is believed that no fees are due in connection with this response. However, the Commissioner is hereby authorized to charge any fee deficiency in connection with this response to Deposit Account No. 19-1345.

Respectfully submitted,

Vincent M. Keil

Vincent M. Keil, Reg. No. 36,838
SENNIGER POWERS
One Metropolitan Square, 16th Floor
St. Louis, Missouri 63102
(314) 231-5400

VMK/MJV/lrw/sxm

Mail Stop Amendment
Via Facsimile No. (571) 273-8300